CLAIMS

- 1. A method for facsimile transmission over a packet
 2 network, comprising:
- 3 establishing a facsimile call between first and
- 4 second facsimile terminals in accordance with a facsimile
- 5 protocol, using a facsimile gateway to convey
- 6 communications between the terminals over the packet
- 7 network;
- 8 awaiting arrival at the gateway of a signal conveyed
- 9 over the packet network from the first terminal, to be
- 10 transmitted from the gateway to the second terminal as
- 11 provided by the protocol;
- transmitting a fill page from the gateway to the
- 13 second terminal if the signal does not arrive within a
- 14 time limit determined in accordance with the protocol;
- 15 and
- 16 receiving the signal at the gateway and transmitting
- 17 the signal from the gateway to the second terminal after
- 18 transmitting the fill page.
- 1 2. A method according to claim 1, wherein the facsimile
- 2 protocol comprises a T.30 protocol of the International
- 3 Telecommunications Union (ITU-T).
- 1 3. A method according to claim 2, wherein the packet
- 2 network operates in accordance with an Internet Protocol
- 3 (IP).
- 1 4. A method according to claim 3, wherein establishing
- 2 the facsimile call comprises establishing a real-time fax
- 3 over IP connection, and wherein transmitting the fill
- 4 page comprises initiating a session fax mode of
- 5 communication in response to a network delay causing the
- 6 signal to fail to arrive within the time limit.

- 1 5. A method according to claim 4, wherein establishing
- 2 the real-time fax over IP connection comprises
- 3 establishing the connection in accordance with an ITU-T
- 4 T.38 protocol.
- 1 6. A method according to claim 1, wherein the first
- 2 terminal comprises a sending terminal, and the second
- 3 terminal comprises a receiving terminal, and wherein
- 4 awaiting the arrival of the signal comprises awaiting
- 5 transmission of a complete page of facsimile data from
- 6 the sending terminal.
- 1 7. A method according to claim 6, wherein the gateway
- 2 comprises a receiving gateway linked to the receiving
- 3 terminal by a telephone line, and wherein awaiting the
- 4 transmission of the complete page comprises awaiting the
- 5 transmission of the complete page by a sending gateway
- 6 linked to the sending terminal.
- 1 8. A method according to claim 1, and comprising
- 2 awaiting arrival of a training message indicative of
- 3 capabilities of the first terminal and conveyed over the
- 4 packet network from the first terminal, and if the
- 5 training message does not arrive within a training time
- 6 limit determined in accordance with the protocol,
- 7 initiating a default training sequence between the
- 8 gateway and the second terminal, substantially
- 9 independently of the capabilities of the first terminal.
- 1 9. A method according to claim 1, wherein the first
- 2 terminal comprises a receiving terminal, and the second
- 3 terminal comprises a sending terminal, which sends at
- 4 least one page of facsimile data to the receiving
- 5 terminal over the packet network using the facsimile

- 6 gateway during the facsimile call, and wherein awaiting
- 7 the arrival of the signal comprises awaiting a
- 8 notification of delivery of the at least one page to the
- 9 receiving terminal.
- 1 10. A method according to claim 9, wherein transmitting
- 2 the fill page comprises instructing the sending terminal
- 3 to perform a line turnaround in order to receive the fill
- 4 page.
- 1 11. A method according to claim 9, wherein the at least
- 2 one page of facsimile data comprises first and second
- 3 pages of facsimile data, and comprising transmitting a
- 4 confirmation signal from the gateway to the sending
- 5 terminal after receiving the first page from the sending
- 6 terminal at the gateway, responsive to which the sending
- 7 terminal sends the second page to the gateway, before
- 8 receiving a confirmation packet at the gateway over the
- 9 network indicating that the first page was received at
- 10 the receiving terminal.
 - 1 12. A method for facsimile transmission over a packet
 - 2 network, comprising:
 - 3 establishing a facsimile call between a sending
 - 4 terminal and a facsimile gateway in communication with
 - 5 the packet network;
 - 6 receiving a first page of facsimile data from the
 - 7 sending terminal at the gateway;
 - 8 conveying the first page of the facsimile data from
 - 9 the gateway over the packet network to a receiving
- 10 terminal;
- 11 transmitting a confirmation signal from the gateway
- 12 to the sending terminal after receiving the first page at
- 13 the gateway, without having waited to receive a first

- 14 confirmation packet over the network indicating that the
- 15 first page was received at the receiving terminal;
- 16 responsive to transmitting the confirmation signal,
- 17 receiving a second page of facsimile data from the
- 18 sending terminal;
- 19 conveying the second page of the facsimile data over
- 20 the packet network to the receiving terminal;
- 21 awaiting arrival at the gateway of the first
- 22 confirmation packet and of a second confirmation packet
- 23 over the network indicating that the second page was
- '24 received at the receiving terminal; and
- 25 responsive to the first and second confirmation
- 26 packets, sending a notification from the gateway to the
- 27 sending terminal before terminating the facsimile call
- 28 that the pages were delivered to the receiving terminal.
- 1 13. A method according to claim 12, wherein establishing
- 2 the facsimile call comprises establishing the call in
- 3 accordance with a T.30 protocol of the International
- 4 Telecommunications Union (ITU-T).
- 1 14. A method according to claim 13, wherein the packet
- 2 network operates in accordance with an Internet Protocol
- 3 (IP).
- 1 15. A method according to claim 14, wherein establishing
- 2 the facsimile call comprises initiating a real-time fax
- 3 over IP connection, and wherein sending the notification
- 4 comprises completing the call in a session fax mode.
- 1 16. A method according to claim 15, wherein initiating
- 2 the real-time fax over IP connection comprises
- 3 establishing the connection in accordance with an ITU-T
- 4 T.38 protocol.

- 1 17. A method according to claim 12, and comprising
- 2 performing a line turnaround and sending at least one
- 3 fill page from the gateway to the sending terminal when
- 4 one or more of the first and second confirmation packets
- 5 do not arrive at the gateway within a predetermined time
- 6 limit.
- 1 18. A method according to claim 12, wherein establishing
- 2 the facsimile call comprises establishing the call over a
- 3 telephone line between the sending terminal and the
- 4 facsimile gateway.
 - 1 19. A method according to claim 18, wherein the gateway
 - 2 comprises a sending gateway, and wherein conveying the
 - 3 first and second pages of the facsimile data comprises
 - 4 conveying the pages from the sending gateway over the
 - 5 packet network to a receiving gateway, which transmits
 - 6 the pages to the receiving terminal.
 - 1 20. Apparatus for facsimile transmission over a packet
 - 2 network, comprising a computer gateway, in communication
 - 3 with the packet network and configured to establish a
 - 4 facsimile call between first and second facsimile
 - 5 terminals in accordance with a facsimile protocol and to
 - 6 convey communications between the terminals over the
 - 7 packet network during the call, the gateway being adapted
 - 8 to await arrival of a signal conveyed over the packet
 - 9 network from the first terminal, which signal is to be
- 10 transmitted from the gateway to the second terminal as
- 11 provided by the protocol, and to transmit a fill page to
- 12 the second terminal if the signal does not arrive within
- 13 a time limit determined in accordance with the protocol,
- 14 and upon receiving the signal, to transmit the signal to
- 15 the second terminal after transmitting the fill page.

- 1 21. Apparatus according to claim 20, wherein the
- 2 facsimile protocol comprises a T.30 protocol of the
- 3 International Telecommunications Union (ITU-T).
- 1 22. Apparatus according to claim 21, wherein the packet
- 2 network operates in accordance with an Internet Protocol
- 3 (IP).
- 1 23. Apparatus according to claim 22, wherein the gateway
- 2 is adapted to establish a real-time fax over IP
- 3 connection, and to initiate a session fax mode of
- 4 communication in response to a network delay causing the
- 5 signal to fail to arrive within the time limit, wherein
- 6 the fill page is transmitted in the session fax mode.
- 1 24. Apparatus according to claim 23, wherein the gateway
- 2 is adapted to establish the real-time fax over IP
- 3 connection in accordance with an ITU-T T.38 protocol.
- 1 25. Apparatus according to claim 20, wherein the first
- 2 terminal comprises a sending terminal, and the second
- 3 terminal comprises a receiving terminal, and wherein the
- 4 signal awaited by the gateway comprises a transmission of
- 5 a complete page of facsimile data from the sending
- 6 terminal.
- 1 26. Apparatus according to claim 25, wherein the gateway
- 2 comprises a receiving gateway linked to the receiving
- 3 terminal by a telephone line, and wherein the complete
- 4 page is transmitted by a sending gateway linked to the
- 5 sending terminal.
- 1 27. Apparatus according to claim 20, wherein the gateway
- 2 is further adapted to await arrival of a training message
- 3 conveyed over the packet network from the first terminal,
- 4 indicative of capabilities of the first terminal, and if

- 5 the training message does not arrive within a training
- 6 time limit determined in accordance with the protocol, to
- 7 initiate a default training sequence with the second
- 8 terminal, substantially independently of the capabilities
- 9 of the first terminal.
- 1 28. Apparatus according to claim 20, wherein the first
- 2 terminal comprises a receiving terminal, and the second
- 3 terminal comprises a sending terminal, which is adapted
- 4 to send at least one page of facsimile data to the
- 5 receiving terminal over the packet network using the
- 6 facsimile gateway during the facsimile call, and wherein
- 7 the signal awaited by the gateway comprises a
- 8 notification of delivery of the at least one page to the
- 9 receiving terminal.
- 1 29. Apparatus according to claim 28, wherein the gateway
- 2 is adapted to instruct the sending terminal to perform a
- 3 line turnaround in order to receive the fill page.
- 1 30. Apparatus according to claim 28, wherein the at
- 2 least one page of facsimile data comprises first and
- 3 second pages of facsimile data, and wherein the gateway
- 4 is adapted to transmit a confirmation signal to the
- 5 sending terminal after receiving the first page from the
- 6 sending terminal, responsive to which confirmation signal
- 7 the sending terminal sends the second page to the
- 8 gateway, before the gateway receives a confirmation
- 9 packet over the network indicating that the first page
- 10 was received at the receiving terminal.
- 1 31. Apparatus for facsimile transmission over a packet
- 2 network, comprising a computer gateway, in communication
- 3 with the network and configured to establish a facsimile
- 4 call with a sending terminal, the gateway being adapted

- 5 to receive a first page of facsimile data from the
- 5 sending terminal, to convey the first page of the
- 7 facsimile data over the packet network to a receiving
- 8 terminal, and to transmit a confirmation signal to the
- 9 sending terminal after receiving the first page without
- 10 having waited to receive a first confirmation packet over
- 11 the network indicating that the first page was received
- 12 at the receiving terminal, and further being adapted to
- 13 receive, responsive to the confirmation signal, a second
- 14 page of facsimile data from the sending terminal and to
- 15 convey the second page of the facsimile data over the
- 16 packet network to the receiving terminal, and still
- 17 further being adapted to await arrival over the network
- 18 of the first confirmation packet and of a second
- 19 confirmation packet indicating that the second page was
- 20 received at the receiving terminal and, responsive to the
- 21 first and second confirmation packets, to send a
- 22 notification to the sending terminal before terminating
- 23 the facsimile call that the pages were delivered to the
- 24 receiving terminal.
- 1 32. Apparatus according to claim 31, wherein the gateway
- 2 is adapted to establish the facsimile call in accordance
- 3 with a T.30 protocol of the International.
- 4 Telecommunications Union (ITU-T).
- 1 33. Apparatus according to claim 32, wherein the packet
- 2 network operates in accordance with an Internet Protocol
- 3 (IP).
- 1 34. Apparatus according to claim 33, wherein the gateway
- 2 is adapted to establish the facsimile call as a real-time
- 3 fax over IP connection, and to complete the call by
- 4 sending the notification in a session fax mode.

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- 1 Apparatus according to claim 34, wherein the gateway
- adapted to establish the real-time fax over ΙP 2
- connection in accordance with an ITU-T T.38 protocol. 3
- Apparatus according to claim 31, wherein the gateway 1
- is adapted to perform a line turnaround and to send at 2
- least one fill page to the sending terminal when one or 3
- 4 more of the first and second confirmation packets do not
- 5 arrive at the gateway within a predetermined time limit.
- Apparatus according to claim 31, wherein the gateway 1
- is configured to establish the call over a telephone line 2
- between the sending terminal and the gateway. 3
- Apparatus according to claim 37, wherein the gateway 1
- comprises a sending gateway, which is adapted to convey 2
- the first and second pages over the packet network to a 3
- which transmits the pages to the 4 receiving gateway,
- receiving terminal. 5
- for facsimile software product 1 39. Α computer
- network, comprising packet 2 transmission over а
- computer-readable medium in which program instructions 3
- are stored, which instructions, when read by a facsimile 4
- communication with the 5 gateway computer in
- network, cause the computer to establish a facsimile call 6
- terminals facsimile 7 between first and second
- accordance with a facsimile protocol and to 8
- communications between the terminals over the
- network, to await arrival of a signal conveyed over the 10
- packet network from the first terminal to be transmitted 11
- from the computer to the second terminal as provided by 12
- the protocol, to transmit a fill page to the second 13
- terminal if the signal does not arrive within a time 14

- 15 limit determined in accordance with the protocol, and
- 16 upon receiving the signal, to transmit the signal to the
- 17 second terminal after transmitting the fill page.
- 1 40. A computer software product for facsimile
- 2 transmission over a packet network, comprising a
- 3 computer-readable medium in which program instructions
- 4 are stored, which instructions, when read by a facsimile
- 5 gateway computer in communication with the packet
- 6 network, cause the computer to establish a facsimile call
- 7 with a sending terminal, to receive a first page of
- 8 facsimile data from the sending terminal, to convey the
- 9 first page of the facsimile data over the packet network
- 10 to a receiving terminal, and to transmit a confirmation
- 11 signal to the sending terminal after receiving the first
- 12 page without having waited to receive a first
- 13 confirmation packet over the network indicating that the
- 14 first page was received at the receiving terminal, and
- 15 further cause the computer to receive a second page of
- 16 facsimile data from the sending terminal responsive to
- 17 transmitting the confirmation signal, and to convey the
- 18 second page of the facsimile data over the packet network
- 19 to the receiving terminal, and still further cause the
- 20 computer to await arrival over the network of the first.
- 21 confirmation packet and of a second confirmation packet
- 22 indicating that the second page was received at the
- 23 receiving terminal, and responsive to the first and
- 24 second confirmation packets, to send a notification to
- 25 the sending terminal before terminating the facsimile
- 26 call that the pages were delivered to the receiving
- 27 terminal.